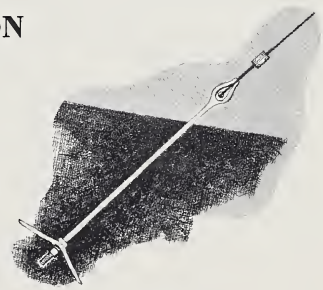
Rural Lines

December 1955

Electrification Section

TELEPHONE SECTION
PAGE 19



Danger Zone for Corrosion
(See page 17.)

RURAL ELECTRIFICATION ADMINISTRATION • U. S. DEPARTMENT OF AGRICULTURE

A Message from the ADMINISTRATOR

During recent weeks questions have been raised which induce me to write again about our G-T policy.

Our policy with respect to G-T loans is clear and simple. It is that such loans are made where the applicant cannot satisfy power needs from existing sources or where a saving in cost over purchased power can be established. I firmly believe that if farmers did not have the right to finance generation and transmission they would not have the bargaining position they have and that they have needed to obtain reasonable wholesale rates.

When I became Administrator a large amount of REA-financed G-T construction was under way and the loans for most of these systems were predicated upon inter-connections and various degrees of integration.

Since then, I have studied data collected covering 1952 operations of those G-T cooperatives which had functioned on a completely self-contained basis and those which had worked out integration arrangements. Costs of delivered power for the self-contained groups varied from 15 to 27 mills per kwh and those of the "integrated" groups varied from 6 to 12 mills per kwh.

Several factors were responsible—reduced investment in facilities, including especially the smaller percentage invested in standby equipment; reduced operating costs by better use of more efficient units and cheaper fuel; and reduced demand requirements due to diversity of daily and seasonal peaks of rural and other loads.

The matter of generation and transmission is probably the most important and most difficult phase of the REA program. Certainly, for me, the decisions in this field are more difficult and troublesome than any others. But I am firmly convinced that if we keep in mind our objective of bringing reliable, low cost service to the farmer we are moving forward on sound ground.

Norman Nelson

Administrator.

Issued monthly by the Rural Electrification Administration, U. S. Department of Agriculture, Washington 25, D. C. Subscribe to this publication from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price, $1.50 a year; foreign, $2 a year; single copies, 15 cents. Printing of this publication has been approved by the Director of the Bureau of the Budget, January 25, 1954 ● Vol. 2, No. 7.

YOU AND POWER USE

Deputy Administrator Strong Outlines Whys and Hows of Coordinated Program

The promotion of power use is an unending job. From day to day new uses for electric power are developed, new ways found to make life more comfortable and convenient through the use of electricity, more ways to reduce the costs of farming and of industrial production through the application of this cheapest of all hired hands, the kilowatt.

It is the responsibility of managers and directors of rural electric cooperatives to extend to members the full benefits of electric power, and that's where power use promotion comes in. Increased use of electric power by members will bring financial stability and strength to our rural electric cooperatives.

To get right down to cases, let's look at those of REA's borrowers which still have some way to go before they can be sure of financial security. Recently we made an analysis of those borrowers to see just what situation was causing their difficulties. We found that they had a variety of troubles —low kwh consumption, low density, high operating costs, high plant investment, low retail rates and extended drought conditions, to name some of the most common.

The thing that is really significant is that in practically every case the corrective action that would most help the borrower was the sale of more electricity. That doesn't mean that they are falling below their kwh consumption estimates. But other unexpected difficulties have developed and in nearly every case increased sale of power is necessary to help cure their ills.

There is the matter of idle services. Some systems have as many as 10 to 20 percent idle services. Think what that can mean in terms of investment per kwh sold. In one REA area, the investment per kwh sold during 1954 ranged from 8 cents to 80 cents. It seems clear that a system whose investment runs as high as 80 cents per kwh sold will have to increase its sales of power. That is probably the only way to assure its financial success and loan repayment.

Now let's talk about load factor. Load factor, as most of you know, is expressed in percentage. It is a measure of the relation of the average load to the peak load.

This article is based on a recent talk by REA Deputy Administrator Fred H. Strong at Madison, Wis.

There are daily, monthly and annual load factors to be considered. When they are high you get, first, continuous and efficient use of plant investment; and, second, generally you get a reduction in the cost per kwh of purchased power.

Let's take an example. A borrower with a monthly load factor of 45 percent under a usual type of wholesale rate would pay 9.1 mills per kwh. At 60 percent load factor, the same typical rate would average 8.3 mills per kwh. For a borrower purchasing one million kwh a month, such an improvement in load factor would save $800 per month, or $9,600

per year. In other words, it would reduce its power cost by about 10 percent.

Annual load factor can have a tremendous influence on costs and system utilization, too. Take a G-T cooperative with an investment of approximately $250 per kw in generation and transmission facilities. Its annual fixed costs on this investment, including debt service and taxes, are about $15 per kw. Now how does this work out in terms of cost per kwh delivered? At an annual load factor of 60 percent, it is 2.9 mills per kwh. At a 30 percent annual load factor, it is 5.7 mills per kwh.

In the case of purchased power, seasonal unbalance can become burdensome because of annual ratchet provisions in wholesale rates. For example, one borrower, because of increased irrigation loads, has seen its annual load factor drop from 35 percent to less than 30 percent in recent years. This has raised its power costs to such an extent that where it was formerly earning well over 100 percent of debt service it is now earning less than 75 percent.

Now, what are some of the uses of electricity that can be promoted and encouraged so as to correct these revenue and load factor situations where they exist? Some of them are among the most basic uses and those having the widest appeal.

Increasing use of lamps and light bulbs, for example, is an income producer that deserves promotion by any rural electric system. The cost to the consumer is relatively low, and if purchased by users of small amounts of electricity, revenue is produced for the power supplier in the early blocks of the rate schedule. Irons and other inexpensive appliances are similar in their ability to produce high revenue per kwh.

The electric water heater is probably the most important example of an appliance that improves load factor. Its kwh usage is large in comparison with kw demand and on some systems off-peak control is feasible. Electric blankets have an ideal off-peak use characteristic for improving the load factor of any system.

In some areas power use programs are needed to correct seasonal unbalance. In some of the southern states, for instance, the summer and winter loads have been thrown badly out of balance because of the rapid increase in the use of air conditioning or a heavy

irrigation load. These systems need to be promoting winter uses of power such as house heating.

On the other hand, most systems in northern states have their

peaks in winter. Obviously they should be promoting summer uses of electricity, especially for productive purposes.

Now let's see how a coordinated power use and electric sales program works. REA and the co-ops, the electric industry and the national organizations of various trade and promotional groups are organized in the Inter-Industry Farm Electric Utilization Council. The national power use workshop and the appliance promotion calendar are two of its major activities up to this time. NRECA has its Willie Wiredhand dealer package program in operation and is one of the advisory groups to the national Inter-Industry Council. There are state councils at work in more than half the the states, and electric co-op statewides are doing power use work in several of the others.

All such activities, of course, have little meaning unless they lead to results at the grass roots.

Getting such a program under way locally is not the easiest job in the world, but it is far from the most difficult. Many of the appliances which will be the most helpful in building load are those which are low in cost, easy for dealers to sell and extremely beneficial to consumers. That helps in getting your program going. Also, there are many people and organizations on whom you can call for help—appliance dealers, wiring and plumbing contractors, farm equipment dealers and distributors, other power suppliers and wiring inspectors. It's money in their pockets when your members increase their use of energy.

In the educational field, there are the Extension and Soil Conservation Services, Farmers Home Administration, vocational agriculture groups, health and sanitation officials, local newspapers, radio and television stations. Promoting the use of electrical equipment ties in with their educational functions.

Right now and in the future, at the direction of Administrator Ancher Nelsen, REA is giving particular attention to this matter of local co-op power use programs. We are working on an outline of a program that we hope every co-op will find practical and simple to adapt to its own situation. Basically, getting results in power use boils down to a matter of realizing what is at stake and putting into the program the money, intelligence and effort that it requires.

44 States Have Program

Forty-four states now have organizations promoting inter-industry power use programs. Statewide inter-industry groups were recently formed in Arkansas, California, and Texas. Most groups were organized following the 5 area power use conferences sponsored in late 1954 by the Inter-Industry Farm Electric Utilization Council.

The Small Reactor Program

AEC Official Explains How New Atomic Proposals Will Be Judged

Today we do not know how to do many of the things required to get economically competitive power from nuclear fuels. We have no shortage of ideas among scientists and engineers on solving the problems. They can predict what the situation will be like if the problems are solved—but that does not save them the time-consuming, difficult task of actually solving them.

To open the way for American industry and others to help with this task, the AEC established the Power Demonstration Reactor Program which was announced on January 10, 1955. In proposals received by the AEC, the size of the individual proposed power plants ranged from 75,000 to 236,000 electrical kilowatts.

We are of the opinion that economic nuclear power will first be achieved on a substantial scale in this country with such large plants. Many features of power reactors simply do not scale up in a wholly predictable fashion. Therefore it is necessary to go essentially to full size to get certain technical data. In addition, it is impossible to estimate the cost of components, the cost of construction, or the cost of operating a power reactor with sufficient accuracy without building one.

However, there are many areas in the United States where power is expensive and such large nuclear power plants would be far too big. In addition, large nuclear plants would be of little use in underdeveloped countries.

Therefore, the Commission concluded that, although it appears more difficult to develop smaller competitive nuclear power plants, the demands, both domestic and international, require it. On September 21, 1955, AEC announced another invitation for Power Demonstration Reactors with a deadline for submitting proposals of February 1, 1956. (See RURAL LINES, November 1955.)

In this second invitation, proposals were invited in three capacity ranges—5,000 to 10,000 kilowatts, 10,000 to 20,000 kilowatts, and 20,000 to 40,000 kilowatts. The hope is that the Commission will be able to accept one or more proposals in each size range. However, all three ranges may not be represented in the final selections because each proposal will compete with all others.

This invitation specifically sets forth the possibility of the Commission paying for and retaining title to all or part of the reactor plant. But AEC hopes that it will not be necessary for the Commis-

---

Based on a speech by W. Kenneth Davis, Director, Division of Reactor Development, U. S. Atomic Energy Commission.

sion to pay for and own any plant. In view of the size of the reactors under consideration it is believed desirable to at least consider Government ownership as an upper limit. For these small reactor plants, as for the larger ones, assistance provided by the Commission is to be "closed ended."

Under this concept the Commission may extend various forms of assistance. But, once these have been agreed to, the dollar amount of assistance to be provided by the Commission is fixed. The proposers have the full technical and economic responsibility. If the project costs more than planned, the extra amount comes out of their pockets. If it can be done for less, then they are ahead by just that much.

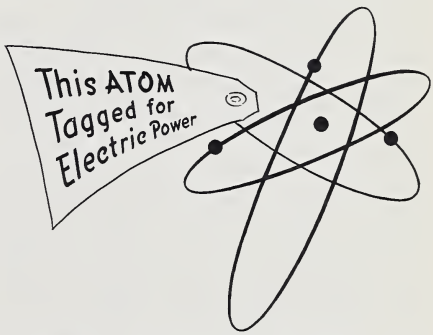
The Commission will consider payments for technological information arising from the development, design, construction, and operation of these plants. The Commission will also consider waiver of charges for nuclear fuel for 5 years from the issuance of an operating license.

We hope that this invitation will stimulate a number of proposals for moderate-sized power reactors to be built in the United States and abroad. Each proposal must be made by a company or group of companies willing and able to accept full technical and economic responsibility for the development, design, construction, and operation of the reactor.

In addition to proposals resulting from invitations under the Power Demonstration Reactor Program, the AEC would like to consider any other proposals that groups may wish to make for new projects.

Such proposals will be considered carefully and, depending upon the circumstances, may be acted upon individually, considered in competition with other proposals of a like nature, or rejected without prejudice to future consideration. Whatever their origin, proposals will be considered in the light of the ground rules and philosophy already discussed.

A key consideration in the program is that the proposed reactors must be types which show promise of producing economic nuclear power and that each



prototype constructed must contribute in a definite and substantial way to the over-all development of that type of reactor. What AEC is seeking is to aid the development of new types and sizes of power reactors—not to build power plants for the sake of having them.

In addition to the exploitation of known scientific and engineering principles which seem capable of giving us economic nuclear power in time, we can anticipate new ideas, discoveries and inventions which will perhaps result in really cheap power—not just competitive power.

Under present tests and proposals, nuclear energy is con-

verted into heat, and that heat in turn is used to produce electricity. Perhaps someone will learn to make electricity directly without going through this thermodynamic cycle. In theory, this might be done more readily with conventional fuels than with nuclear fuel. Success in the generation of electricity directly from the fuel material will depend upon a new invention which might apply to either fossil or nuclear fuel. In short, we cannot now foresee what the future will bring, but we can have complete confidence that whatever it brings will be new and different.

I am concerned because our people do not seem to understand where our country stands today in the development of economic nuclear power nor the time required for this achievement. Perhaps I am unduly concerned because I am in the spot—along with others—of having to produce the anticipated results. We are only asking for trouble here and abroad if we lead others to expect too much. On the other hand, we must have enthusiasm and support if we are to be successful. A fine state of balance is required.

If this sounds somewhat cautious or pessimistic (I prefer the term "realistic"), it is only because I feel the pendulum has swung too far on the side of overoptimism. However, my "realism" does not stem from any basic concern over what we can do with adequate support and enthusiasm. It is not quite 13 years since the first nuclear chain reactor was built. Our real effort on power reactors was begun only recently. It is easy to forget the time for carrying a reactor project to the point where it produces significant results.

However, few of us would be working as we are in this field if we did not have complete confidence that economic nuclear power is a realistic and feasible goal.

Production of energy by electric utilities reached a new all time record of 517,892,173,000 kilowatt-hours for the year ended August 31, according to a report from the Federal Power Commission.

This was 13 percent over the figures for the year ended August 31, 1954. The previous record for any 12-month period was 509,720,642,000 kwh for the 12 months ended July 31, 1955.

• • • • •

Farmers and other rural consumers on REA-financed distribution lines increased their use of power more than 14 percent during the 1955 fiscal year.

• • • • •

REA borrowers are distributing more than twice as much power as they did in 1950. Average annual use of power by farm consumers increased from 1,752 kwh in calendar 1950 to 2,712 kwh in 1954.

• • • • •

The energy sales by REA borrowers amount to about $1,100,000 per day.

Safety Gains Continue

The responsibility for employee safety is basic with power system management.

That is the theme of safety instructors working with REA borrowers to develop adequate training programs.

They point out that in the early days of the light and power industry, when safety was largely a matter of individual discretion, the fatality rate was alarmingly high. Then the early twenties brought a safety awareness which led to the inauguration of safety programs in the industry which resulted in savings in lives and dollars. These programs also contributed to better work methods.

Shortly after REA was established, borrowers recognized their responsibility for safety and formulated plans for safety programs. These were put into effect in various parts of the country. REA set up a staff to assist borrowers in this work.

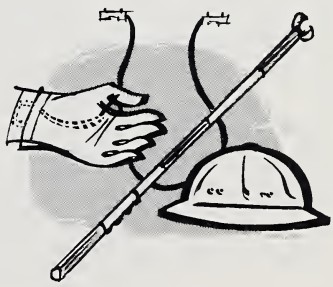
The U. S. Office of Education cooperated, usually with assistance on state levels through state departments of vocational education, trade and industrial divisions, and state colleges and universities. Funds were provided when necessary under authorization of the Smith-Hughes and George-Dean acts of 1917.

REA borrowers in Illinois in 1941 were the first to set up and participate in a State safety program, according to records available to REA. Ohio, Texas and Wisconsin followed shortly.

By 1944, the safety program had begun to show vital gains. For example, that year 14 states had the itinerant instructor-type of safety program. Of 11 fatal accidents that year, all but 1 were in states with no safety program.

Today, there are itinerant instructor-type safety programs with 53 instructors in 32 states. These Job Training and Safety Instructors serve 912 of the 954 active distribution borrowers.

The rate of fatal accidents per thousand miles of energized line dropped approximately one-third



from 1944 through 1954.

Electric shock takes the highest toll in lives among REA borrowers, according to REA's safety engineer. It accounts for 78.4 percent of all fatal accidents. The

3 most common causes for electric shock are contact with energized conductor, violation of correct work position, and failure to use protective equipment. Bare contact is the top offender.

Here is the record, percentagewise, of causes of fatalities on REA-financed distribution systems, based on reports available to REA:

Electric shock	78.4
Pole handling	6.1
Transportation	5.8
Right-of-way	4.0
Falls	2.4
Explosives	1.1
Drowning	1.1
Other	1.1

From 1945 through 1954, in states with the itinerant instructor-type safety program, insurance costs have been lowered an average of 11.4 percent while, at the same time, the workmen's compensation benefits have increased on an average of 32.4 percent, according to these reports.

Insurance costs are a significant item of the borrower's operating expenses. Workmen's compensation premiums constitute a large part of these costs, according to the safety instructors. The insurance rate is affected by the borrower's safety experience. If management can show a good safety record, the cost is low; if the accident frequency is high, costs rise accordingly. A cooperative with a high accident frequency will affect not only its own costs but also those of other cooperatives in the same state.

The safety people point out that management is responsible for the safety of its employees and is concerned with the safety of its consumers and the general public. Experience shows that the effectiveness of safety programs varies in proportion to management's awareness of this responsibility.

"Safety pays dividends in dollars and, most important of all, in human lives," say the safety instructors.

National Safety Congress

A highlight of the electric utilities section of the 43rd National Safety Congress and Exposition in Chicago, October 17-21, was a demonstration, "Teach 'em, Don't Kill 'em." It was presented by H. C. Potthast, Supervising Instructor, and Hugh Burke and Earl Ehlers of the Wisconsin Rural Electric Cooperative Association.

Of the 8,000 persons attending the Congress representing utility, industrial, school, transit and other groups concerned with all aspects of employee and public safety, about one-tenth attended the electric utility section.

At the National Safety and Job Training Conference in Brainerd, Minn., it was decided to present the Chairman of the National Conference with the hard hat used by the late Frank LaMaster, former REA safety engineer. At the end of his term, the chairman would present the hat to his successor, with this practice to be followed each year.

Pioneer

Tom Berg

The glamor of the bush-flying days in Alaska surrounds Tom Berg, secretary of the Chugach Electric Association, who helped organize the system which now takes power to the rural areas around Anchorage.

Mr. Berg, a veteran commercial pilot, first went to Alaska in 1938. "But," he says, "6 months of winter in an interior village discouraged me to the point of leaving. While waiting at Cordova for a boat to go home, I took a ride over to Anchorage for a change of scenery. Within 3 days I was working for the Woodley Airways (now Pacific Northwest Airlines) with all thought of leaving forgotten."

Later, he worked for an airline in Denver, Colo., but went back to Alaska when the Japanese took possession of Kiska and Attu during World War II. He returned to fly civilians out of the Territory. He has stayed there ever since.

Born on a Nevada ranch in 1909, Tom Berg grew up in the country. When he was about 7 years old he saw a "flying machine" at the San Francisco World's Fair, and the flying bug bit him. Mr. Berg says, "Lindbergh's flight to Paris proved to me that aviation was the thing for me." He studied engineering in college, but couldn't resist the lure of flying.

In 1948, Mr. Berg and J. E. Dundon organized signers for an REA loan to bring electrification to the rural areas around Anchorage. Both men saw the need of electricity for development, and gave long hours of hard work to make their wishes become reality.

Today, the Chugach Electric services 9,000 consumers over 390 miles of line, and, in partnership with the Alaska Railroad in Anchorage, owns and operates a $6,000,000 steam generating plant of 9,500 kw.

Mr. Berg has been a member of the board since the Association organized, and spends many hours each week taking care of important paper-work for the system.

The persons featured on this page have played key roles in bringing rural electric service to their own communities, thus helping their neighbors receive the benefits of electric power. This page also acknowledges the contributions of those many others who are nameless to us, but known to many of our readers. We salute all of our pioneers.

The Blue Grass Rural Electric Cooperative, Nicholasville, Ky., believes in keeping up with new developments on farm and home uses of electricity and in telling its members about them.

For instance, the co-op has been conducting an experiment with the blacklight trap for tobacco moths. So that all of its members can benefit from this experiment, the co-op publicized its findings in its newsletter. Two traps were set up, one on the farm of E. T. Bryan near Nicholasville, and one on the farm of Tom Baldwin near Richmond.

Mr. Bryan says, "If all farms would install one of these blacklights we would soon cut down on the worm crop. I think money spent on these traps is money well spent."

The Morrow Electric Cooperative, Mt. Gilead, Ohio, reports in its newsletter that when one of its members, F. O. VanSickle, sold his 1954 corn crop, he found that several hundred bushels had molded. The corn had been picked late when it should have been dry and was stored in well-ventilated cribs where it should have continued to cure. But it wasn't and didn't. So now the VanSickle farm

POWE
EXCI

is equipped with a heated-air crop dryer. Mr. VanSickle is also fitting out overhead lines with air ducts so that the drying outfit can be used to dry down soybeans, wheat, and other small grains for safe storage.

Add to your list of new uses for electricity this one from Louisiana. Sixty cane farmers are "cooking bugs with electricity"—treating seed cane electrically to kill a virus causing stunting disease, a condition that stunts growth and costs cane farmers millions of dollars each year.

A small plantation-size unit was installed on the plantation of A. V. Allain, vice president of Teche Electric Cooperative, Jennerette, La. Mr. Allain says the technique is the brainchild of Dr. Rene J. Steib of the Louisiana State University and Dr. C. A. Schexnayder of the U.S.D.A. Sugar Cane Experiment Station at Houma.

Teche Manager Edgar Chaney, Jr., warns that the units are expensive, require a 5 hp motor, blowers, and a special insulated shed. They take about 15 kva of electric capacity at a time when the systems already have peak load problems. He urges that farmers cooperate in buying and

R USE
ANGE

installing units, and that they consult with their power supplier before doing so.

Farmers in the 7-county area served by **Lighthouse Electric Cooperative,** Floydada, Tex., are seeing that their crops get plenty of moisture every year through irrigation.

Lighthouse now serves nearly 700 wells, with pumps averaging 45 hp. Last year irrigation pumps served by the co-op used an average of 55,750 kwh. It cost farmers an average of $836.26 a year to operate them.

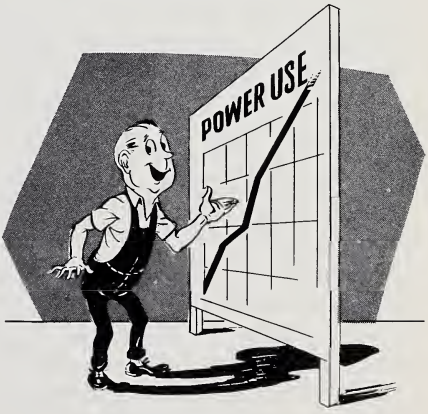
The steady swing to irrigation is a direct result of successive seasons of drought coupled with several years of power use planning by Manager Melvin Henry, the board directors and Claude Weathersbee, irrigation specialist. The secret is showing farmers how to tailor-fit irrigation systems to the needs of their land.

D. E. K. Rural Electric Cooperative, Estherville, Iowa, reports that 4 members have installed electric radiant heating recently and a fifth has contracted for it.

Mr. and Mrs. Otto Schaper had electric radiant heat installed when they remodeled their house and have already reported on its use during the first cold spells this fall. Mr. Schaper says, "You just cannot believe it until you experience it, how much it is like the rays from the sun and the feeling of comfort afforded by electric radiant heating."

K. W. Joines, the co-op wiring inspector and electrification adviser, found that working with the heating engineers and other members who were installing electric heat was too much for him. So he and Mrs. Joines signed up for electric heat for their home near Spirit Lake.

Manager Ben Spain of the **Columbia Power Electric Cooperative,** Monument, Ore., reports that the new customer service program is paying off in brisk sales of appliances. For example, in one month 6 food freezers were added to the lines, according to the Northwest RURALITE. The co-op offers bonus credits to be applied on the purchase of certain appliances, and has an expert available to help with the wiring in of such appliances.



Power Groups Discuss Plans

Suppliers Work Out Problems in Tri-State Talks

Representatives of rural electric cooperatives and power suppliers attending the second annual Area Power Conference in Grand Forks, N. Dak., in mid-October, took a closer look at system integration as a way of working out power supply problems. They liked what they saw.

The 2-day meeting was called by the co-sponsors, Minnkota Power Cooperative, Central Power Electric Cooperative, Otter Tail Power Company and Northern States Power Company to point up the rapidly growing electrical loads throughout Minnesota and North and South Dakota.

The meeting was held in an atmosphere of understanding and cooperation. The cooperatives with other segments of the electric industry heard speakers picture a bright outlook for power use and supply, electrified farming, the hope of rich gains from "atoms in agriculture" and the opportunities that lie ahead through continued linking of power systems. Teamwork between rural cooperatives and electric companies was cited as one of the best ways to speed the coming of a new electrical era.

The story of how the 4 power suppliers linked their generating and transmission systems together for savings in plant construction costs and to firm up power supply was told in the September 1944 issue of RURAL LINES. Faced with serious load shortages, the suppliers teamed up to share their power output until electricity from Garrison Dam becomes available early in 1956.

Fred Strong, Deputy Administrator of REA, in a luncheon talk said: "Talking about team-work in solving power problems here is a bit like 'carrying coal to Newcastle.' Nowhere in the country has there been as effective a demonstration of cooperation as you power suppliers have shown.

Strong Cities Objective

"You are teaming up with the objective of bringing reliable, low-cost power to the consumer. REA recognizes the value of such tie-ups between its borrowers and other suppliers and has made loans where plans are feasible."

Speaking on the topic, "Twenty Years of Rural Electrification," L. Splickan, president of Central Power Electric Cooperative, Inc., Minot, N. Dak., summed up some of the benefits to be gained by "teaming up" and by "power sharing."

He told the gathering, "Twenty years of REA has proved that we can get adequate service at lowest possible costs by cooperating with existing companies where these companies are also of a cooperative nature.

"Minnkota and its member distribution co-ops in eastern North Dakota and northwestern

Minnesota have working agreements with both Otter Tail and Northern States while Central Power Cooperative in central North Dakota has integration agreements with Otter Tail and is presently negotiating with Northern States for a tie-line at Minot. And Dakotas Electric Cooperative in the southeastern part of the state has an arrangement with Montana-Dakota Utilities.

"I believe these agreements are a credit to the co-ops and the power company managements, because in all cases it means reduced costs to both rural and urban electric consumers."

Another speaker, C. G. Wright, president of Otter Tail Power Company, said, "I am sure we have all come to realize the economic advantages lying in joint system studies which have resulted in interconnections and interchange agreements between the various suppliers through jointly planned facilities. Much duplication of facilities has been avoided, and yet mutual advantages have been obtained in service reliability and improved system efficiencies.

"We have a joint responsibility in supplying the customers in our areas, so it becomes our responsibility to continually seek new and better ways of providing that service. We will all of us gain far more by collaborating in our efforts to accomplish this purpose than if each of us goes his separate way."

Power Suppliers Set Up Atom Research Fund

At the close of the conference, the four power suppliers—Minnkota, Central Otter Tail and Northern States—announced a joint $100,000 five-year grant to the University of Minnesota for research in the application of atomic energy in agriculture.

Four $5,000 checks from the 4 power suppliers presented to the University were the first of 5 such payments that will be made annually to the university's Institute of Agriculture.

A joint statement from the 4 power suppliers read, "This is an historic occasion—for the first time an effort is being made to bring to farmers specifically the many benefits that will accrue from nuclear research.

"It is entirely appropriate that these four organizations unite to sponsor this research grant. All four are concerned with providing the best possible electric service to farmers at the lowest cost.

"We have all worked to lighten the load of the farmer by increasing the use of time-saving electrical devices. We are united in our efforts to serve the farmer. When atomic-fueled power becomes economically feasible we will adopt it, just as we now adopt every new device that promotes our efficiency and keeps costs to the customer as low as possible.

"In the meantime there are many other peaceful uses of atomic energy. The present and potential uses to which atomic developments can be put on the farm are limitless. It is to hasten the day when these advances are available to all farmers that we have set up this grant to the University of Minnesota."

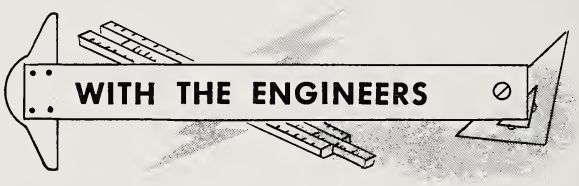
Dr. Harlow S. Person, 1875-1955

Dr. Harlow S. Person, 80, former consultant to REA and national and international authority on management, died in New York on Novmeber 7, 1955.

Dr. Person was named consultant to the REA staff in 1935 when the program was first established. He served in that capacity until his retirement on July 1, 1953.

For 28 years, Dr. Person lectured on scientific management at Columbia University in New York City. For many years he was managing director of the Taylor Society, predecessor of the Society for the Advancement of Management. He maintained his own offices as a management consultant in New York for 20 years.

The author of many books and articles on scientific management and economics, he received the gold medal of the International Committee of Scientific Management in 1948.



The time to inspect the roof and flashing on a building and make repairs is before cold fall rains start.

• • • • •

Current-carrying capacity of meter sockets, rather than meters, may be the limiting factor in metering secondary loads.

• • • • •

Nuclear power generation will not make conventional steam stations obsolete; there will be a large market for steam stations for many years to come.

• • • • •

The electric power industry makes daily use of alternating current frequencies ranging from one cycle to six billion cycles per second.

Where vibration breaks of jumpers occur, take a look at the condition of the conductor under ties.

• • • • •

Established chemical brush control techniques are foliage spraying, stump spraying and basal spraying.

• • • • •

System planning involves the use of foresight. It is essentially a process of looking before you leap.

• • • • •

Some 25,000,000 poles stand in the lines of REA-financed systems.

• • • • •

Phase converters, like motors, are considered consumer devices.

• • • • •

Pretest all rubber gloves before issuing for use.

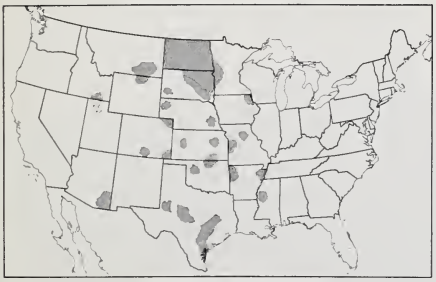
Corrosion Can Be Curbed

REA-Borrower Study Considers Causes and Suggests Controls

Under average conditions for an REA-financed electric distribution system with 1,350 miles of line, corrosion is likely to cost more than $25,000 a year.

If the corrosion is unusually rapid for any reason it can seriously increase operating costs and in some circumstances cause financial difficulties to the borrower.

Underground corrosion has received special attention recently because steel anchor rods rusted or corroded off after only 5 to 15 years service in some specific soils areas. The anchor rod is an important connecting link in the anchor and guy assembly that holds a pole, at a corner or other location where the line conductors pull against it. These anchor rods are so important that even a few failures are considered serious.



Areas of excessive underground corrosion reported by distribution co-ops.

REA staff engineers, in cooperation with electric borrowers, made a special study to learn the causes of the corrosion and the measures for stopping the trouble at minimum cost. Results of the study have recently been published in REA Bulletin 169–30, "Underground Corrosion of Anchor Rods and Other Components of Electric Distribution Lines."

Underground corrosion of anchor rods is caused usually by a sort of battery action between the steel anchor rods and the copper-covered ground rods driven at transformers, meters and other locations for electrical grounding. This action causes a direct current to flow along the electric neutral conductor from the copper ground to the guy and anchor. At the anchor the current flows into the earth and back toward the copper ground, where it returns to the neutral. The steel anchor rod and anchor are gradually eaten away during this process, while a white material is deposited over the copper.

Fortunately, iron and copper make a very poor battery in most soils because the copper quickly becomes covered with a film that stops the current and the battery action. But in certain types of soil found in some locations

mostly west of the Mississippi River, the corrosion reaction continues at a fast enough rate so that the buried steel does not last as long as it should. These corrosive locations usually are low and poorly drained. They have been found in the shaded areas shown in the map.

Since the corrosion of anchor rods is associated with electric currents, the currents can be measured to learn where the corrosion is occurring. Strange as it may seem, the most practical way to learn the condition of underground portions of an anchor rod is to measure the direct current flowing toward the anchor rod in the guy. Since the corrosion current flows continuously in one direction, it is easily distinguished from the alternating electric currents normally carried by the line conductors.

The galvanized steel anchor rods can, of course, corrode underground even without the battery action or direct current in the guy. However, all experience to date indicates that the corrosion is accompanied by direct current flow in the guy wherever anchor rod corrosion has presented a problem.

Three types of remedies are available for relieving the corrosion. They are:

1. Replace some of the copper-covered ground electrodes with galvanized steel ground rods, and use only steel under ground in future construction.
2. Install strain insulators in guys to stop the current, or use copper-covered anchor rods and log anchors to eliminate the steel being damaged.
3. Use sacrificial anodes of magnesium, zinc or aluminum. These are buried in the ground and connected as system grounds, and discharge current so vigorously that they prevent the current from flowing to the earth at the anchor rods or other buried steel which is thus protected against damage. The anodes are gradually eaten away and eventually must be replaced.

If anchor rods on any electric system are being corroded excessively, one or more of the 3 measures that have been described will usually provide a satisfactory answer, according to REA Bulletin 169–30. The one that should be selected in a particular case depends on circumstances; it should be the one that produces best results at least cost. The "steel grounding" approach appears to be most economical in a majority of cases.

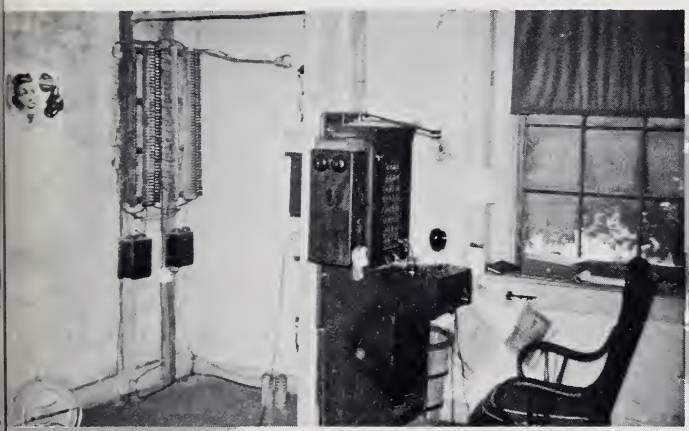
There is no easy formula for relieving an underground corrosion problem. The best remedy for one distribution system does not necessarily apply to another system in the next county. Therefore, corrective measures should be applied only after careful study of the entire problem along the lines suggested in the REA bulletin.

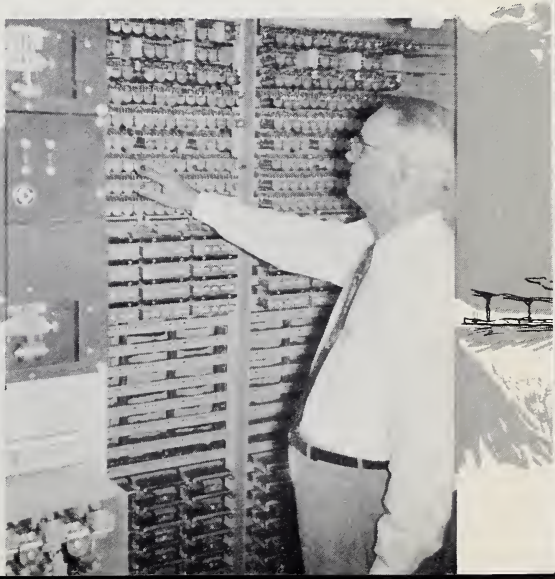
Experience during the REA study has reaffirmed that corrosion, while costly indeed, is not something that "just happens" so that the high cost is inevitable. It can be kept to a minimum by proper design and good maintenance practices.

Rural Lines

Telephone Section

Only the map was up-to-date a few months ago in the Union Point Telephone Company office at White Plains, Ga. That was before it cut over to modern dial service.





J. H. Darby, president and manager, points out automatic equipment in new office building.

Brother Team in Pennsylvania
Rebuilds Out-moded System, Proves That

Management Pays

What does it take to revamp an obsolescent rural telephone system and provide efficient, modern service? Whatever it is, subscribers of the Lycoming Telephone Company, Pine Grove, Pa., are convinced that Ralph Hyle, company president, has it.

Their views are backed up by the American Institute of Management of New York City. The Institute named the Lycoming company in its list of "Excellent Managements," which includes both United States and Canadian companies.

The company is really run by a brother team. Lewis Hyle is general manager and has had some 30 years experience in telephone construction and engineering.

Other REA borrowers will be interested in some of the things the Hyles have done to attain their eminence in the Independent telephone management field. These points stand out on the record:

1. Remarkable skill in financing and stock-selling. They sold nearly half a million dollars worth of preferred and common stock in less than 5 years.

2. Rapid climb from an original investment of $20,000 and 456 stations to assets of well over a million dollars and more than 4,000 subscribers.

3. Installation of 9 new, unattended dial exchanges, serving 75 rural communities.

4. Centralization of accounting and billing departments and use of automatic office machines, with resulting economies.

5. Use of cable on 90 percent of outside plant has helped in cutting down maintenance costs.

6. Completion of system improvements which have improved operating ratios.

Back in 1944, the Hyles pooled their funds and experience to organize the Lycoming Telephone Company. Their first step was to buy the out-dated Ralston, Rose Valley and Loyalsock companies in Lycoming county with a total of 456 stations. They replaced the old magneto-operated systems and overloaded multi-party lines with lead cable and modern dial equipment. New lines were run into rural sections and more subscribers added.

The Hyles continued to expand and rebuild. Lycoming today has 3 division offices to handle the business of its fast expanding telephone territory.

There are many signs of good management in the company's operations.

For instance, yearly operating revenue per telephone averages $55.95 while operating expense per station amount to $36.02. Preventive maintenance has helped to bring about trouble-free service. Office work is handled more efficiently than before. Microfilming enables the company to mail original toll tickets to subscrib-

ers, thus furnishing more information on long-distance calls and charges. While the company's 3 divisional directories used to be an expense item, today advertising in them represents a new source of income.

Financing was Ralph Hyle's special task. He says, "We put about $20,000 of our own money into the business and paid the bulk of our construction costs from several short-term loans. It was tough getting those first loans since the company was in its rebuilding stage. But as our new system took shape, loans came more easily.

"We put every nickel of revenue into the business during the first 6 years and didn't begin selling stock until about 5 years after we formed Lycoming. We had to show that our stock was a good investment and there was something in it for buyers."

Today, 373 subscribers are stockholders. At first, sales to farmers were for a few shares at a time. But as subscribers used their new dial telephones more and more, shares sold in larger blocs. Businessmen in towns served by the company joined in the buying.

How did Ralph Hyle make short work of one of the toughest jobs facing independent telephone companies?

President Hyle says that stock selling along country roads and on "Main Street" isn't easy. Fairly good results were obtained from house-to-house calling and by talking frankly with farm families and businessmen about the company's aims and problems.

Later, chatty sales messages were enclosed with monthly bills to subscribers and stock selling speeded up.

No paid radio, television or newspaper advertising was used to promote sale of common or preferred stock. However, news and feature stories telling about the company's plans and activities were placed in many newspapers and proved helpful in building a friendly climate of subscriber-company relations.

Lycoming's officers, directors and employees all joined in the stock selling drive. Employees were given a $2 commission on each share of stock sold. On one single day Ralph Hyle sold $17,000 worth of shares by telephone from his Pine Grove office.

No more stock will be sold for the present. Planned new expansion will be financed under a $1.3 million REA loan made to the company in June.

This ¾-ton construction truck is one of 3 such units used by Lycoming Telephone Company. Trucks are equipped with special winch and hoist which makes pole-setting a 2-man job, instead of requiring the average 4-man crew.

Rural Go-Getters

Tennessee Company's Growth Built on Founder's Sound Policies

Successful business-getting methods, management steps and operational techniques initiated by the late Billy L. Howard, president and founder of Millington Telephone Company, Inc., Millington, Tenn., are helping the organization's present leaders "cash in" on its expanding rural area today.

Of course, having its modern headquarters and central office exchange located at the hub of one of the country's boming rural sections puts the company in line for good subscriber gains. "But," says young W. S. Howard, who succeeded his father as president, "location isn't everything."

J. C. Carter, plant superintendent, checks voltage on battery charger, in Millington's new office building.

It's taken Billy Howard's able planning plus a big areawide selling job to turn out a smooth-running system. And that's what Millington Telephone has developed in a few years.

The company, which received its first REA loan in April 1952, was cut over a year ago with more than 1,500 subscribers. It operates over 35 miles of cable and 45 miles of open wire line in Shelby County. An REA loan last February of $527,000 will be used by the company to convert the Mumford telephone exchange in Tipton County to automatic dial service. It has 460 subscribers.

The town of Millington (population 5,500), close to Memphis, has a thriving business and market center. It's no secret that the company hopes to have 3,000 subscribers in the Millington section and 1,200 from Mumford by 1958. Subscriber incomes are from production of cotton, corn and livestock and the teeming industries springing up around Memphis.

To hold on to their present 1,700 subscribers and to ready themselves for future growth, company officers have taken some long strides.

Here are the major steps:

1. Provision of good subscriber service. This has paid off in sizable gains in toll business, averaging 23,000 calls monthly now.

2. An all-out area-wide selling job to acquaint subscribers and residents with the reasons for rate increases and the benefits of central office service. Drive included personal talks with community and business leaders, service clubs and local organizations.

3. Hand-picked personnel to get the right worker for each job.

4. Encouragement of company employees and officers to join in community activities, accept leadership responsibilities.

5. Stress public relations—getting along with community people and leaders. Work to build goodwill over service area by friendly visits with subscribers.

6. Fair but firm dealings with subscribers. The company sends a reminder to slow subscribers 10 days after bill is due. If bill has not been paid 10 days later, a second reminder is sent.

7. Toll tickets are microfilmed and original sent to subscriber, film retained by company.

8. Provision of outdoor pay stations. Eight stations in use now average $50 a month; 6 more on way. Station sites are picked carefully.

9. Monthly profit and loss statement kept; shows company's financial standing to penny.

10. Training new employees. Both office and outside plant crew are trained by the company.

11. "Dial Tones," monthly newsletter, is newsy, informative, mixes jokes and good humor. It is included with bills.

12. Sponsors baseball team in local "Peewee League." Telephone company advertising is inscribed on players' suits.

13. Special billing machine speeds handling of bills, payrolls, checks, tax reports, and accounts payable and receivable ledgers.

Here's a sample of Millington Telephone Company's public relations. When the company cut over last year to modern dial service, officers treated the crowd at the ceremony to an old-fashioned barbecue with all the trimmings. It was their way of saying "thank you" to subscribers and of showing rural folks of the area the "dream" telephone system that Billy Howard made come true.

Borrowers Cut Over 34 New Exchanges

Nineteen REA borrowers reported that they cut over 34 new automatic dial exchanges during August and September. They are: Hill Country Telephone Co-op, Ingram, Texas—Hunt, Ingram, Mountain Home and Doss exchanges; Ballard Rural Telephone Co-op, Center, Ky.—Bandana; Etex Telephone Co-op, Gilmer, Texas—Bettie and Rosewood; Oregon Telephone Corp., Mt. Vernon, Ore. — Dayville; Grand River Mutual Telephone Corp., Princeton, Mo.—Mercer; Scott County Telephone Co-op, Gate City, Va.—Clinchport, Duffield, Dunfannon, Ft. Blackmore, Nickelsville, and Williams Mill; Dickey Rural Telephone Mutual, Ellendale, N. Dak.—Ludden and Silver Leaf; Forest Hill Telephone Co., Forest Hill, La.—Glenmore; Albion Telephone Co., Albion, Idaho—Albion; United Telephone Association, Dodge City, Kans.—Copeland; Smithville Telephone Co., Elletsville, Ind. — Stanford; Gulf Telephone Co., Foley, Ala.—Lillian and Elberta; Pioneer Telephone Co-op, Philomath, Ore.—Waldport; Egyptian Telephone Co-op, Steeleville, Ill.—Glenn, Blair and Baldwin; Yadkin Valley Telephone Membership Corp., Yadkinville, N. C.—New Hope; Bulloch County Rural Telephone Co-op, Statesboro, Ga.—Portal; Colfax Telephone Exchange, Colfax, Calif.—Colfax; Pioneer Telephone Association, Ulysses, Kans.—Rolla, Richfield, and Moscow; and Public Service Telephone Co., Reynolds, Ga.—Lizella.

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON 25, D. C.

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, $300
(GPO)

Loans Approved September 24 Through October 21, 1955

Electrification

$ 50,000	First Electric Cooperative, Jacksonville, Ark.
265,000	Union Electric Membership Corp., Monroe, N. C.
1,333,000	Deep East Texas Electric Co-op, San Augustine, Tex.
900,000	Dickens County Electric Co-op, Spur, Tex.
125,000	Verendrye Electric Cooperative, Velva, N. Dak.
216,000	Winnebago Rural Electric Co-op, Thompson, Iowa
50,000	Pee Dee Electric Membership Corp., Wadesboro, N.C.
50,000	Roseau Electric Cooperative, Roseau, Minn.
50,000	Red Lake Electric Cooperative, Red Lake Falls, Minn.
50,000	Tri-County Electric Cooperative, Carrington, N. Dak.
50,000	Randolph Electric Membership Corp., Asheboro, N.C.
442,000	Lyntegar Electric Cooperative, Tahoka, Tex.
327,000	Missoula Electric Cooperative, Missoula, Mont.
275,000	O & A Electric Cooperative, Newaygo, Mich.
330,000	Jefferson Davis Electric Co-op, Jennings, La.
885,000	Carroll Electric Membership Corp., Carrollton, Ga.
235,000	Fox Creek Rural Electric Co-op, Lawrenceburg, Ky.
300,000	Morgan County Rural Electric Membership Corp., Martinsville, Ind.
445,000	B-K Electric Cooperative, Seymour, Tex.
265,000	Warren Electric Cooperative, Youngsville, Pa.
305,000	Lorain-Medina Rural Electric Co-op, Wellington, Ohio
1,897,000	Morgan County Rural Electric Assn., Fort Morgan, Colo.
165,000	York County Electric Co-op, York, S.C.
745,000	Big Bend Electric Co-op, Ritzville, Wash.
135,000	Fannin County Electric Co-op, Bonham, Tex.
50,000	P. K. M. Electric Cooperative, Warren, Minn.
490,000	Ouachita Rural Electric Co-op, Camden, Ark.
600,000	Lee County Electric Co-op, Ft. Myers, Fla.
50,000	James Valley Electric Co-op, Edgeley, N. Dak.
340,000	Edisto Electric Cooperative, Bamberg, S.C.

Telephone

$ 208,000	Eastern Telephone Company, West Enfield, Me.
159,000	Bolivar Telephone Company, Bolivar, Mo.
191,000	Manchester-Hartland Telephone Co., Manchester, Minn.
390,000	Northeast Nebraska Telephone Co., Hubbard, Nebr.
334,000	W. E. G. Dial Telephone, Inc., Gardner, Kans.
469,000	United Telephone Association, Dodge City, Kans.
145,000	Mid Century Telephone Co-op, Canton, Ill.
2,958,000	Northeastern Telephone Corp., London, Ky.
217,000	Romain Telephone Company, Plains, Tex.
145,000	The Athens Telephone Company, Athens, La.
146,000	Gem State Utilities Corp., Richfield, Idaho